CLAIMS

1. Process for the continuous production of ultrathin hot rolled strip from thin slab obtained by continuous casting, comprising the following process steps:

- a continuous casting step (1);
- a pre-transformation (5) subsequent to continuous casting step (1);
- an induction heating (8); and
- a final transformation (18) with previous plastic stretching (17), descaling (17a) and subsequent cooling and coiling,

characterized by:

- the slab leaving the mould with a central crown of a value preferably between 0,5 and 5,0 mm at each side;
- a reduction of the slab thickness in continuous casting during the solidification (3.1) by 60% at maximum, from 100 to 70 mm, until a reduction from 80 to 40 mm;
- a secondary cooling during the liquid steel core reduction step (3B), performed only by spray nozzles (3a), with the following characteristics:
  - specific water delivery between 0.6 and 3.0 liters per kg of cast steel,
  - decreasing cooling density in the direction of the slab advancement due to liquid core reduction,
  - selective control of cooling fluid flow rates between the front side and the back side of the slab;
- said pre-transformation being a roughing (5) step of the thin slab upon solidification at a surface temperature of the slab > 1100°C with not more than four passes to obtain an intermediate strip (5.3) having different thicknesses chosen in the range from 30 to 8 mm with a central crown of up to 0.4 mm at each side;
- said induction heating (8) being adapted to fix various temperatures of the intermediate strip chosen between 1000 and 1400°C and overheating function of the head and tail;

- said plastic stretching (17) combined with descaling (17a) to eliminate scale from the surface of the intermediate strip;
- said final transformation (18) being a rolling step down to a thickness of the finished strip of 0.4 mm as a minimum with not more than six passes and a controlled temperature of the hot rolled strip at the exit therefrom > 750°C (AC1); and
- a controlled cooling (14) of the strip (13) in the time between the end of the final rolling (18) and the coiling until a minimum temperature of 200° C according to the corresponding T.T.T. diagram (14.1) specific for the steel quality of the strip thickness.

2. Process according to claim 1, characterized in that said roughing step (5) occurs directly after the slab solidification with a relatively hot core (7) of the slab at a temperature of less than 1450°C, near the temperature of steel solidification (7.1) higher than 1100°C, thereby with an inverted temperature gradient (7.2) throughout half thickness of the slab.

3. Process according to claim 2, characterized in that immediately after the roughing step (5) the intermediate strip (5.3) can be separated crosswise, preferably cut (10).

4. Process according to claim 3, characterized in that directly after the possible separation (10) of the intermediate strip a withdrawal (11) of plate-shaped sheets is possible by means of a cross-wise transportation.

5. Process according to any of the preceding claims, characterized in that the intermediate strip (5.3) can be directly guided to the final rolling immediately after the temperature regulation by induction heating (8) in case of continuous rolling (15) or is subject to an intermediate winding (16.1) before the final rolling.

6. Process according to any previous claim, characterized in that the intermediate strip (5.3) can be rolled in a controlled way through six passes at a maximum to a finished hot rolled strip with a minimum thickness of 0.4 mm and a temperature at the exit from the last pass of final rolling (18) in a range (24) between a minimum of 750°C (AC1) and preferably a maximum of 900°C (AC3).

7. Process according to claim 5, characterized in that the intermediate

strip (5.3) can enter the finishing mill (18) at different speeds between 0.2 and 5.0 m/s.

8. Process according to any previous claims, characterized in that between the last rolling pass and the coiling step the finished hot rolled strip (13) can be brought in a thermally controlled way and in the time to a final temperature higher than 200°C and thermo-mechanically (14) according to the T.T.T. diagram (14.1).

9. Process according to claim 8, characterized in that the thermally controlled management (14) in the time of the hot finished strip (13) with a determined thickness and chemical composition (steel analysis) by means of a cooling strategy thanks to a cooling line (19.1), (20.1), as well as to an isolation or heating line (20.3) based on the corresponding T.T.T. diagram (14.1) the desired structures and properties of the material are obtained and consequently the desired steel quality (23) between the last rolling pass and the coiling step.

10. Process according to claim 9, characterized in that the finished hot rolled strip (13) is wound with the desired properties of the material.

11. Process according to claim 9, characterized in that the finished strip (13) with the desired material properties can be directly brought to subsequent working steps (20.2) without preliminary winding.

12. Process according to any one of the preceding claims, characterized by comprising a process control system (22) provided with specific parameters for the steel type according to the T.T.T. diagram (14.1) for a treatment rolling (14) of thermo-mechanical nature, consisting in a main master system (22.7) and six process subsystems (from 22.1 to 22.6) for programming, performing and controlling the whole process.

13. Production line for carrying out the process, comprising a machine 1, for the continuous casting of thin slab with a mould with of 2.2 m at maximum and a thickness at the mould exit of 100-70 mm with production lines connected thereto, such as:

- a roughing mill (5) with not more than four rolling stands;
- an induction heating path (8);

- a finishing mill (18) with not more than six rolling stands;
- at least one coiling station (20); and
- a cooling line between the finishing mill (18) and the coiling station (20),
- characterized by the fact that said continuous casting machine (1) is able to give a crowned shape of the cross section of the slabs and further comprising in particular:
- a roller table (3) for reducing the slab (3.1) thickness during the solidification from 100 to 70 mm at the mould exit up to a solidification thickness (3.2) of 80-40 mm within the said roller table itself at the casting speed as high as possible (2.3) of 10m/min;
- a secondary spray cooling system (3B) by means of spray nozzles in correspondence with the said casting machine (1);
- said roughing mill (5) being equipped with rolls suitable to obtain a crown of up to 0,4 mm at each side;
- said induction heating path (8) having a length of 40 m at maximum, immediately downstream of the roughing mill (5) with temperatures of intermediate strip (8.1) at the furnace exit of 1100-1400°C and suitable to manage the overheating of the head and tail of the intermediate strip by means specific algorithm; and
- a plastic stretching device (17) combined with a descaling device (17a), placed before said finishing mill (18), composed of a battery of upper and lower rolls in a total number of at least three.

14. Production line according to claim 13, characterized in that said roughing mill (5) is placed directly at the end of the continuous casting machine (1) at a distance of 10 m therefrom.

15. Production line according to claim 13 or 14, characterized in that immediately after the roughing mill (5) there is provided a device for transverse cutting (10), preferably a shearing device.

16. Production line according to claim 15, characterized in that immediately after the transverse cutting device or shears (10) there is provided a cross-wise transportation device for the removal of plates from the intermediate

strip.

17. Production line according to claim 13, characterized in that between the induction heating path (8) and the plastic stretching device (17) there is provided an intermediate winding station (16.1) immediately upstream of the finishing mill (18).

18. Production line according to claim 13, characterized in that the distance between the stands of the finishing mill (18) is of 6 m at maximum.

19. Production line according to claim 13, characterized in that immediately after the last stand of the finishing mill (18) there is provided a coiling station (19), preferably a carousel coiler, being preceded by an intensive cooling line (19.1).

20. Production line according to claim 19, characterized by comprising an additional conventional cooling line for hot rolled strip (20.1) with at least one downcoiler station (20) at the end of the whole production line.

21. Production line according to claims 19 and 20, characterized in that the cooling lines (19.1; 20.1) can be also equipped with an isolating line and/or an induction heating furnace (20.3).

22. Production line according to claim 13, characterized in that the hot rolled strip, being rolled and cooled in a thermally controlled manner and in the time (14) is directly brought to the subsequent working line without preliminary coiling.

23. Production line according to any of claims 13-22, characterized by comprising a process control system (22) consisting in a "master" main system (22.7) and additional six peripheral subsystems (22.1-22.6) for programming, guiding and controlling the whole production.

24. Production line according to claim 23, characterized in that the process control system (22) receives from the outside, such as the programming central computer system, specific parameters relating to the steel quality for thermo-mechanical rolling (14) according to the T.T.T. diagram (14.1) with the exit temperature from the last stand of the finishing mill (18) in the range AC3/AC1 (24) between 900 and 750°C.